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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,995	12/16/2005	Hideo Morimoto	07700/066001	9140
22511	7590	10/25/2007		
OSHA LIANG L.L.P. 1221 MCKINNEY STREET SUITE 2800 HOUSTON, TX 77010			EXAMINER DUNLAP, JONATHAN M	
			ART UNIT 2855	PAPER NUMBER
			NOTIFICATION DATE 10/25/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/560,995

Applicant(s)

MORIMOTO, HIDEO

Examiner

Jonathan Dunlap

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1, 4-13, 16 and 19-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16 and 27-32 is/are allowed.
- 6) ☒ Claim(s) 1, 4-11, 13 and 19-26 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**Final ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 11 and 12 recites the limitation "first member" and "second member".

There is insufficient antecedent basis for this limitation in the claim. Perhaps Applicant intended for the limitations to remain dependant upon claim 10? For purpose of examination, the limitations and claims will be considered dependant upon claim 10.

***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 1, 4-5 and 7-8** are rejected under 35 U.S.C. 102(b) as being anticipated by **Amazeen et al. (4,745,812)**.

Considering **claim 1**, Amazeen discloses a 6-axis sensor for measuring 6-axis forces and moments or 6-axis accelerations and angular accelerations, externally applied, characterized by comprising:

- a plurality of strain gauges **PZR1-8** disposed on one plane (**Figure 10d and 11; Column 7, lines 31-40**);

- a plurality of first diaphragms **14** to which the plurality of strain gauges **PZR1-8** are attached (**Figures 5, 10d and 11; Column 5, lines 21-29**);  
and
- wherein the plurality of first diaphragms **14** are arranged around a central point of the plane at regular angular intervals and at the same distance from the central point (**Figure 5**).

Considering **claim 4**, Amazeen discloses that the angular intervals are 90 degrees (**Figure 5**).

Considering **claim 5**, Amazeen discloses that the diaphragms **14** are disposed in positive and negative directions on X and Y axes with an origin being defined at the central point (**Figure 5**).

Considering **claim 7**, Amazeen discloses that a thin portion of each of the plurality of first diaphragms **14** is annular and provided with eight strain gauges **PZR1-8**, and the strain gauges are disposed at outer and inner edge portions of each of the plurality of first diaphragms **14** on a line extending between a central point of the first diaphragm **14** and the central point of the plane, and at outer and inner edge portions of the first diaphragm **14** on a line perpendicular to the former line at the central point of the first diaphragm **14** (**Figure 11; Column 7, lines 31-37**).

Considering **claim 8**, Amazeen discloses an operative body **16** provided on a central portion of one or more of the plurality of first diaphragms **14**, and 6-axis accelerations and angular accelerations applied to the 6-axis sensor are measured

**(Figure 11, 10d; Column 3, lines 44-52; Column 8, lines 67-68; Column 9 all; Column 10 all; Column 11, lines all, Column 12, lines 1-45).**

Considering **claim 23**, Amazeen discloses that each of the strain gauges is made of a piezoresistance element (**Column 5, lines 41-46**).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Amazeen et al. (U.S. Patent 4,745,812)** in view of **Watson et al. (U.S. Patent 4,094,192)**.

The invention by Amazeen, fails to disclose that the angular interval is 120 degrees.

5. However, Watson discloses evenly spaced intervals of 120 degrees (**Figure 2**).

Therefore, it would have been obvious to one of ordinary skill in the art to use an evenly spaced interval of 120 degrees as taught by Watson in the invention by Amazeen. The motivation for doing so is found in the teachings of Watson, "it is desirable that the strain gauges are so placed that no one component of input force be favored over other components in terms of the magnitude of strain gauge response to a unit load" (**Column 3, lines 21-25**). Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made because the teachings of Watson as combined with the disclosure of Amazeen would necessitate fewer strain

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gauges, thus reducing the number of components required to be manufactured into the sensor which ultimately would reduce manufacturing costs.

6. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Amazeen et al. (U.S. Patent 4,745,812)** in view of **Morimoto (JP 07-130263)**

The invention by Amazeen fails to disclose a second member comprising a second diaphragm opposed to the first diaphragm and provided with no strain gauges and a connecting shaft connecting the opposed first and second diaphragms.

7. However, Morimoto teaches:

- A second diaphragm **34** opposed to the first diaphragm **10** and provided with no strain gauges (**Drawing 4; [0007-11]**); and
- A connecting shaft **32** connecting the opposed first **10** and second **34** diaphragms (**Drawing 4; [0011]**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second member comprising a second diaphragm without strain gauges with a connecting shaft between the opposed first and second diaphragms as taught by Morimoto in the invention by Amazeen. The motivation for doing so is to provide a surface and a connection portion through which excessive force will be distributed and therefore will not destroy or rupture the first diaphragm as taught by Morimoto (**[0007]; [0011]**).

8. **Claim 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Amazeen et al. (U.S. Patent 4,745,812)** of **EP 1 284 055**, hereafter **Datex**.

Considering **claim 10**, the invention by Amazeen fails to disclose a second member comprising a second diaphragm, which comprises a plurality of strain gauges and a connecting shaft connecting the opposed first and second diaphragms.

9. However, Datex teaches a second member comprising a second diaphragm provided with a plurality of strain gauges disposed on one plane (**Figure 1 and 2; Page 1, lines 47-56**).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a second diaphragm comprising a plurality of strain gauges connected coaxially with the first diaphragm as taught by Datex in the invention by Amazeen. The motivation for doing so is found in the teachings of Datex, "a further particular advantage resides in the fact that the circular symmetry of the transducer renders response independent of the direction of application of forces...[accordingly] the invention can be made highly sensitive and accurate" (**Page 1, lines 67-73**).

Considering **claim 11**, the invention by Amazeen fails to disclose that the strain gauges of the first member and strain gauges of the second member are disposed symmetrically with respect to the barycentric point of the 6-axis sensor.

10. However, Datex teaches strain gauges symmetrically disposed about a barycentric point of the 6-axis sensor (**Figures 1 and 2**).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to disposed strain gauges symmetrically about a barycentric point of the sensor as taught by Datex in the invention by Amazeen. The motivation for doing so is found in the teachings of Datex, "a further particular advantage resides in the fact that the circular symmetry of the transducer renders response independent of the direction of application of forces...[accordingly] the invention can be made highly sensitive and accurate" (**Page 1, lines 67-73**). Furthermore, the opposing strain gauges endure equal temperature adjustment, and therefore, the effect of temperature variation can be negated (**Datex, Page 1, lines 62-67**).

11. **Claim 13, 19-20, 22 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over **JP-2581820**, hereafter **Kabushiki** in view of **EP 1 284 055**, hereafter **Datex**.

Considering **claim 13**, Kabushiki discloses:

- a plurality of strain gauges **44,45,46 (a,b)** disposed on one plane (**Figure 3; Page 5; lines 29-40**);
- only one of the plurality of first diaphragms **11** is disposed on the plane (**Figure 3; Page 5, lines 26-40**);
- operative bodies **41\*** in contact with the plurality of first diaphragms **11** at positions arranged around the central point of the plane at regular angular intervals and at the same distance from the central point (**Figure 3; Figure 3; Page 5, lines 26-40**); and



- the 6-axis sensor is configured to measure 6-axis accelerations and angular accelerations applied to the sensor (**Page 5, lines 38-40**).

The invention by Kabushiki fails to disclose a plurality of first diaphragms to which the plurality of strain gauges are attached.

12. However, Datex teaches a second member comprising a second diaphragm provided with a plurality of strain gauges disposed on one plane (**Figure 1 and 2; Page 1, lines 47-56**).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a second diaphragm comprising a plurality of strain gauges connected coaxially with the first diaphragm as taught by Datex in the invention by Amazeen. The motivation for doing so is found in the teachings of Datex, "a further particular advantage resides in the fact that the circular symmetry of the transducer renders response independent of the direction of application of forces...[accordingly] the invention can be made highly sensitive and accurate" (**Page 1, lines 67-73**).

Considering **claim 19**, Kabushiki discloses that the angular interval is 90 degrees (**Figure 3**).

Considering **claim 20**, Kabushiki discloses that the operative bodies **41\*** are disposed in positive and negative directions on X and Y axes with an origin being defined at the central point of the first diaphragm **11** (**Figure 3**).

Considering **claim 22**, Kabushiki discloses strain gauges disposed:

- At edge portions of the operative bodies on a line extending between a central point of a portion on the plane corresponding to the operative bodies, and the central point of the first diaphragm (**Figure 3**);
- At edge portions of the operative bodies on a line perpendicular to the former line at the central point of the portion on the plane corresponding to the operative bodies (**Figure 3**); and
- At either of edge portions of the operative bodies and edge portions of the first diaphragm, at positions arranged around the central point of the first diaphragm at regular angular intervals and at the same distance from the central point (**Figure 3**).

Considering **claim 25**, Kabushiki discloses that the strain gauges are made of a piezoresistance element (**Page 1, lines 3-5**).

13. **Claim 21** is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP-2581820**, hereafter **Kabushiki** in view of **EP 1 284 055** as applied to claim 13 above and further in view of **Watson et al. (U.S. Patent 4,094,192)**.

The invention by Kabushiki, as modified by Datex fails to disclose that the angular interval is 120 degrees.

14. However, Watson discloses evenly spaced intervals of 120 degrees (**Figure 2**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an evenly spaced interval of 120 degrees as taught by Watson in the invention by Kabushiki, as modified by Datex. The motivation for

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doing so is found in the teachings of Watson, "it is desirable that the strain gauges are so placed that no one component of input force be favored over other components in terms of the magnitude of strain gauge response to a unit load" (**Column 3, lines 21-25**). Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made because the teachings of Watson as combined with the disclosure of Kabushiki and Datex would necessitate fewer strain gauges, thus reducing the number of components required to be manufactured into the sensor which ultimately would reduce manufacturing costs.

15. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Amazeen et al. (U.S. Patent 4,745,812)** in view of **JP-2838361**, hereafter **Osaka-Fu**.

The invention by Amazeen fails to disclose that the strain gauges are made of a thin film of chromium oxide formed on an insulating film.

16. However, Osaka-Fu teaches that each of the strain gauges is made of a thin film of chromium oxide formed on an insulating film (**[0013-15]**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use strain gauges made of chromium oxide formed on an insulating film as taught by Osaka-Fu in the invention by Amazeen. The motivation for doing so is to generate a low temperature coefficient of resistance and high gauge factor as found in the teachings of Osaka-Fu (**[0017]**).

17. **Claim 26** is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP-2581820**, hereafter **Kabushiki** in view of **EP 1 284 055**, hereafter **Datex** as applied to claim 13 above, and further in view of **JP-2838361**, hereafter **Osaka-Fu**.

The invention by Kabushiki, as modified by Datex, fails to disclose that the strain gauges are made of a thin film of chromium oxide formed on an insulating film.

18. However, Osaka-Fu teaches that each of the strain gauges is made of a thin film of chromium oxide formed on an insulating film ([0013-15]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use strain gauges made of chromium oxide formed on an insulating film as taught by Osaka-Fu in the invention by Kabushiki, as modified by Datex. The motivation for doing so is to generate a low temperature coefficient of resistance and high gauge factor as found in the teachings of Osaka-Fu ([0017]).

#### ***Allowable Subject Matter***

**Claims 16 and 27-32** are allowed.

Claims 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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### **Conclusion**


Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Dunlap whose telephone number is (571) 270-1335. The examiner can normally be reached on M-F 8-5 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Jonathan Dunlap  
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June 19, 2007

  
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